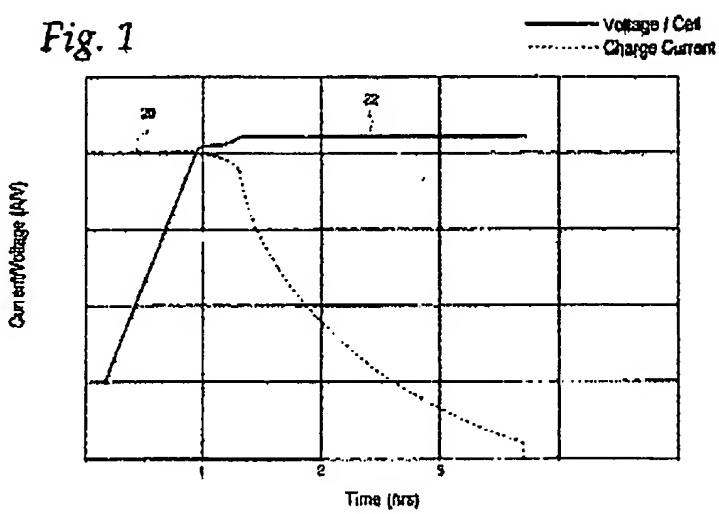
REMARKS

Upon entry of the instant amendment, claims 1-9 are pending. Claim 1 has been amended to more particularly point out the applicant's invention. It is respectfully submitted that upon entry of the instant amendment and consideration of the remarks below that the application is in condition for allowance.

CLAIM REJECTIONS-35 USC § 102

Claims 1, 2, 4, 5 and 7 have been rejected under 35 USC § 102 (b) as being unpatentable over Morioka et al US Patent No. 5,831,412 ("the Morioka et al patent"). Before getting into the specific rejection, it may be helpful to explain the invention and the system disclosed in the Morioka et al patent. The Examiner's attention is directed below to the charging characteristics for an exemplary lithium ion battery, as illustrated in Fig. 1 of the instant application, reprinted below for the convenience of the Examiner.

Fig. 1



As is known in the art, the charging characteristics of such lithium ion batteries define a constant current mode and a constant voltage mode. As shown above, the dotted line 20 represents the charging current while the solid line 22 represents the battery cell voltage.

With such lithium ion batteries, the charging current is determined by the following equation:

$$I_{CHARGE} = \frac{VCHARGE - VBATT}{RCHARGER + RBATT}$$, where

V_{CHARGE} = charging voltage of the charger

V_{BATT} = battery voltage

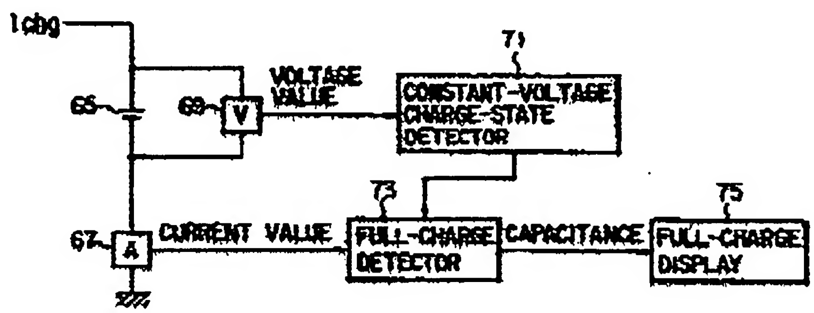
$R_{CHARGER}$ = resistance of the charger circuit

R_{BATT} = resistance of the battery.

With such lithium ion batteries, a constant charging voltage V_{CHARGE} is applied to the battery initially. The circuit resistance ($R_{CHARGER} + R_{BATT}$) is constant. The constant charging voltage is selected to be high enough so that a constant current is applied to the battery until the battery cell voltage reaches a predetermined level, defining a constant current mode or charge state as shown. As the battery cell begins to charge, the battery cell voltage V_{BATT} increases to a constant voltage level, defining a constant voltage mode. In the constant voltage mode, as shown by the solid curve 22, the charging current I_{CHARGE} decreases, as shown by the dashed curve 20, since the circuit resistance ($R_{CHARGER} + R_{BATT}$) is constant. As shown above, the exemplary battery cell takes over 3 ½ hours to be fully charged. As should be apparent from the exemplary charging characteristics above, the last hour or so of charging produces has a relatively small impact on the charge state of the battery. In fact, such batteries are known to take as long to charge the battery the last 20% of total capacity as the first 80%. The present, the system simply measures the charging current to the battery independent of the battery cell voltage and

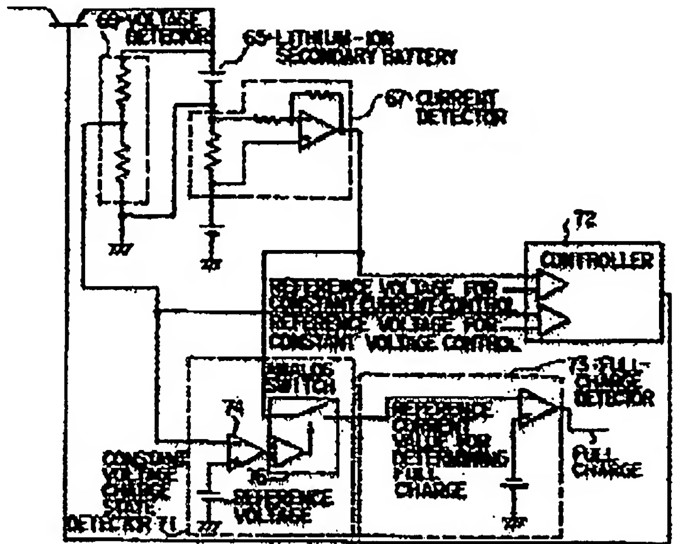
the charge mode of the battery. When the charging current drops to a level representing, for example, 80% or more of full charge, a visual indication is provided to indicate a near full charge state of the battery.

Fig. 8 of the Morioka et al patent has been cited by the Examiner in support of the rejection. Fig. 8 is shown below.



Paragraph 2 of the Detailed Action states on one hand that the sensor in the Morioka et al patent includes the components 67, 69, 71 and 73. As shown, the component 69 is used for sensing the battery voltage as it is clearly disposed across the battery cell. The component 71 is for determining when the battery cell is in a constant voltage charge state (Morioka et al patent, Col. 13, lines 39-42; "The detector 71 is provided for monitoring the charge voltage measured by the voltmeter 69 and detects whether or not the secondary battery 65 is in a constant-voltage charge state.").

The block diagram above is implemented by the circuit illustrated in Fig. 28 of the Morioka et al patent ("Fig. 28 is a detailed circuit diagram of the fifth embodiment shown in Fig. 8.: Morioka et al patent, Col. 13, lines 50 and 51).



F I G. 28

As shown, a full charge detector 73 is used to indicate a "*full charge state*" (Col. 13, line 66-Col. 14, line 2; "The full charge detector 73 compares the supplied charge current with the reference current to detect the ***full charge state.***"). The full charge detector 73 does not detect any state less than a fully charged state since the representative current supplied to the comparator forming the full charge detector is a "reference current value for determining full charge" Fig. 28.). In addition, the charging current applied to the inverting input of the comparator of the full charge detector 73 is applied thereto by way of an analog switch 76, which only connects the battery charging current to the full charge detector 73 when the battery is in a constant voltage charging mode as determined by the constant voltage charge state detector 71 ("Upon detecting the constant voltage charge state, the voltage comparator 74 outputs the detection result to an analog switch 76. In response to the detection result, the analog switch 76 turns on to supply a charge current from the current detector 67 to the full-charge detector 73. Col. 13, lines 62-66). The constant voltage detector 71 monitors the battery cell voltage and applies it to a comparator 74 in the constant voltage charge state detector 71 by way of a voltage detector 69 formed from a pair of voltage dividing resistors. Thus, it can hardly be said that the

Morioka et al patent discloses a system for detecting a near full state of charge let alone one that provides such an indication independent of the battery cell voltage and charge state.

Now, turning to rejection, in order for there to be anticipation, each and every one of the elements must be found in a single reference. It is respectfully submitted that the claims, as amended, recite elements not disclosed or suggested by the Morioka et al. patent. For example, the claims now recite that the near full state of charge signal is generated independent of the battery voltage and state of battery charge. As should be clear from the discussion above, the Morioka et al patent not only does not disclose such a configuration but actually teaches away from it. In addition, the Morioka et al does not disclose a charge indication based upon any value less than a state of full charge. In fact, the Morioka et al patent determines a full charge state by determining the battery capacitance as shown in Fig. 13 by integrating the charging current (See , for example, step S77). The system in accordance with the present invention does away with all of the complexity taught by the Morioka et al patent and simply provides a signal representative of a near full state of charge by simply monitoring the charging current. For all of the above reasons, the Examiner is respectfully requested to reconsider and withdraw the rejection.

CLAIM REJECTIONS – 35 U.S.C. § 103

Claims 3, 6, 8 and 9 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Morioka et al patent , in view of Schousek et al U.S. Patent No. 6,222,370 ("the Schousek et al patent"). It is respectfully submitted that the claims, as amended, recite subject matter not disclosed or suggested by either the Morioka et al or the Schousek et al. patents, either singly or in combination. Claims 3, 6, 8 and 9 are dependent upon claim 1. The Morioka et al patent has been discussed above. The Schousek et al patent does not disclose or suggest a system for generating a signal representative of a near full state of charge as recited in the claims. As such, it is respectfully submitted that the Examiner has failed to establish a prima facie case of obviousness as set forth in the MPEP §§ 2142 and 2143. In particular, in order to establish a *prima facie* case of obviousness, three criteria must be met as set forth in accordance with MPEP

§ 2143.

> "First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.
>
> The teaching or suggestion to make the claimed combination reasonable expectation of success must both be found in the prior art, not in the Applicant's disclosure."

For these reasons and for the above reasons, the Examiner is respectfully requested to reconsider and withdraw this rejection.

Respectfully submitted,

KATTEN MUCHIN ROSENMAN LLP

By: John S Paniaguas
John S. Paniaguas
Registration No. 31,051
Attorney for Applicant(s)

KATTEN MUCHIN ROSENMAN LLP
525 W. Monroe Street
Chicago, Illinois 60661-3693
(312) 902-5200
(312) 902-1061
Customer No.: 27160